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COMBINING SEASAT RADAR AND LANDSAT MULTISPECTRAL IMAGES

To develop geological remote sensing techniques for resources exploration, a Seasat radar image and a Landsat multispectral image of the San Rafael Swell in east central Utah were superimposed or coregistered by JPL's Image Processing Laboratory for an investigation conducted by the Radar Remote Sensing Team. Despite difficulties posed by differing geometries and brightness characteristics of the two systems, enough common points were found to coregister the images.

Because the two imaging systems give different information about the Earth's surface, the combination of the two appears to provide better rock identification capability than either alone. The coregistration method is a promising geological tool for discriminating rock types such as sandstone and shale. For example, sandstone formations of similar composition but differing outcrop characteristics may be separated by the combined image because of the roughness information added by Seasat's radar data.

The San Rafael Swell is a rugged upfold of sedimentary rocks about 100 kilometers long and 50 km wide. Exposed rocks are mostly sandstone and shale with some limestone and conglomerate. The swell contains economically significant deposits of uranium, found in particular sandstone formations.

Figure (opposite page): The upfolded structural configuration and differing rock types are shown in this coregistered Seasat-Landsat image of the San Rafael Swell, whose jagged sandstone cliffs are sharply delineated. The browns and copper tones are basically sandstones and sand dunes; the blues are shales. The San Rafael River winds through the right center of the image, joining the Green River to the east.